Application No.: 10/065,103 **Docket No.: JCLA9142**

AMENDMENTS

In the Claims:

Please amend the claims according to the following listing of claims and substitute it for all prior versions and listings of claims in the application.

1. (currently amended) An under-bump metallurgical structure between the bonding pad of a die and a solder bump made from a lead-tin alloy or a lead-free alloy, comprising:

a metallic layer over the bonding pad; and

a buffer metallic structure ~~mini bump~~ between the metallic layer and the solder bump for reducing the growth of inter-metallic compound between the metallic layer and the solder bump, wherein the buffer metallic structure is properly covered by the solder bump.

2. (withdrawn) The under-bump metallurgical structure of claim 1, wherein the buffer metallic structure has a melting point greater than the solder bump.

3. (withdrawn) The under-bump metallurgical structure of claim 1, wherein the buffer metallic structure has a capacity to wet the solder bump.

4. (withdrawn) The under-bump metallurgical structure of claim 1, wherein the metallic layer further includes:

a adhesion layer over the bonding pad;

a barrier layer over the adhesion layer; and

a wettable layer between the barrier layer and the buffer metallic structure.

5. (withdrawn) The under-bump metallurgical structure of claim 4, wherein material constituting the wettable layer is selected from a group consisting of copper, aluminum, silver, nickel and gold and an alloy of the above elements.

6. (withdrawn) The under-bump metallurgical structure of claim 1, wherein the metallic layer at least includes:

an adhesion layer over the bonding pad; and

a barrier layer between the adhesion layer and the buffer metallic structure.

7. (withdrawn) The under-bump metallurgical structure of claim 6, wherein material constituting the barrier layer is selected from a group consisting of copper, nickel, aluminum, silver and gold and an alloy of the above elements.

8. (withdrawn) The under-bump metallurgical structure of claim 1, wherein the buffer metallic structure further includes a buffer metallic layer, between the metallic layer and the solder bump.

9. (withdrawn) The under-bump metallurgical structure of claim 8, wherein the buffer metallic layer is a layer of lead between the metallic layer and the solder bump.

10. (withdrawn) The under-bump metallurgical structure of claim 8, wherein the buffer metallic layer is a composite layer including a layer of lead and a layer of tin such that the layer of lead is formed over the metallic layer and the layer of tin is formed between the layer of lead and the solder bump.

11. (withdrawn) The under-bump metallurgical structure of claim 8, wherein the buffer metallic layer is a composite layer including a first lead layer, a tin layer and a second lead layer such that the first lead layer is formed over the metallic layer, the tin layer is formed over the first lead layer and the second lead layer is formed between the tin layer and the solder bump.

Claim 12. (canceled).

13. (withdrawn) The under-bump metallurgical structure of claim 12, wherein the buffer metallic structure further includes a tin layer between the mini bump and the solder bump.

14. (currently amended) The under-bump metallurgical structure of claim 1, wherein the principle constituent of the buffer metallic structure ~~mini bump~~ is lead.

15. (currently amended) The under-bump metallurgical structure of claim 1, wherein the principle constituent of the buffer metallic structure ~~mini bump~~ is lead-tin alloy.

16. (currently amended) The under-bump metallurgical structure of claim 15, wherein the percentage of lead and tin in the lead-tin alloy constituting the buffer metallic structure ~~mini bump~~ is about 95% lead and 5% tin.

17. (withdrawn) The under-bump metallurgical structure of claim 1, wherein when the solder bump is made of the lead-free alloy, the lead-free alloy include one selected from the group consisting of SnAg, SnAgBi, SnAgBiCu, SnAgBiCuGe, SnAgBiX, SnAgCu, SnBi, SnCu, SnZn, SnCuSbAg, SnSb and SnZnBi.

18. (withdrawn) The under-bump metallurgical structure of claim 1, wherein the under-bump metallurgical structure comprise one selected from the group consisting of Sn, Ag, Sn/Ag, Sn/Cu, and lead-free alloy.

19. (withdrawn) An under-bump metallurgical structure between the bonding pad of a substrate and a solder bump, wherein the principle constituent of the solder bump includes a lead-tin alloy or a lead-free alloy and the principle constituent of the bonding pad is copper, the under-bump metallurgical structure comprising:

a metallic layer over the bonding pad; and

a buffer metallic layer between the metallic layer and the solder bump for reducing the growth of inter-metallic compound between the metallic layer and the solder bump.

20. (withdrawn) An under-bump metallurgical structure between the bonding pad of a substrate and a solder bump, wherein the principle constituent of the solder bump includes a lead-tin alloy or a lead-free alloy and the principle constituent of the bonding pad is copper, the under-bump metallurgical structure comprising:

a buffer metallic layer between the bonding pad and the solder bump for reducing the growth of inter-metallic compound between the bonding pad and the solder bump.

21. (new) The under-bump metallurgical structure of claim 1, wherein the buffer metallic structure includes a mini bump between the metallic layer and the solder bump.

22. (new) The under-bump metallurgical structure of claim 21, wherein the principle constituent of the mini bump is lead.

23. (new) The under-bump metallurgical structure of claim 21, wherein the principle constituent of the mini bump is lead-tin alloy.

24. (new) The under-bump metallurgical structure of claim 23, wherein the percentage of lead and tin in the lead-tin alloy constituting the mini bump is about 95% lead and 5% tin.

25. (new) The under-bump metallurgical structure of claim 1, wherein the buffer metallic structure is totally covered by the solder bump.